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July 1963

PUBLICATIONS AND PATENTS
of the
NORTHERN UTILIZATION RESEARCH AND DEVELOPMENT DIVISION

Peoria, Illinois, for the period

JANUARY - JUNE 1963

U.S. DEPT. OF AGRICULTURE
RECORDS SECTION
CURRENT SERIAL RECORDS

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Congress in 1938 authorized four regional laboratories to conduct basic and applied research designed to expand, improve, and develop through science and technology the utilization of American farm crops. Agricultural products assigned the Northern Division are: The cereal grains--corn, wheat, barley, grain sorghum, and oats; the oilseeds--soybean, flaxseed, safflower, and erucic acid-containing oilseeds; and new crops. The abstracts in this list describe current research on these commodities and indicate progress achieved by the Northern Division.

Northern Division publications are available, in conformance with the policy of the Department of Agriculture, to scientists and other specialists, librarians, representatives of the press, and others interested. Reprints of publications marked with an asterisk (*) are not available for distribution.

Requests for specific reprints should be by number and addressed to: Northern Utilization Research and Development Division, 1815 North University, Peoria, Illinois 61604. Mailing lists are not maintained except for the list of Publications and Patents.

Most of the publications are reprints of articles published in journals that are available in libraries. Anyone who needs information may obtain it most efficiently by consulting a technical library. Photographic copies of most journal articles on research at this Division can be purchased from the National Agricultural Library of the U. S. Department of Agriculture, Washington, D. C. 20250.

No publications will be sent regularly in response to foreign requests unless exchange arrangements have been made with: Director, National Agricultural Library of the Department of Agriculture, Washington, D. C. 20250.

Printed copies of patents, which are assigned to the Secretary of Agriculture, can be obtained only by purchase (25 cents each) from the Commissioner of Patents, U. S. Patent Office, Washington, D. C. 20231. Order by number, do not send stamps.

Copies of previous lists of publications and patents are available on request.

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PUBLICATIONS

[Publications marked (*) are not available for distribution. When requesting reprints, please order by number.]

- 1480 PROBLEMS INVOLVED IN DIALYZING LOW CONCENTRATIONS OF INORGANIC PYROPHOSPHATE.
Paul R. Watson, Jay E. Pittsley, and Allene Jeanes.
Anal. Biochem. 4(6): 505-508. December 1962.

The phosphate in phosphomannan from Hansenula holstii NRRL Y-2448 was shown to occur as the orthophosphate by the rapid appearance of inorganic orthophosphate in dialyzates of the periodate-oxidized phosphomannan after treatment with alkali. Under these conditions pyrophosphate did not permeate a regenerated cellulose tubing used for dialysis but was hydrolyzed slowly to orthophosphate, which did pass through the membrane. Separation of charges on the membrane surface appears to cause this hydrolysis.

- 1481 SOYBEANS--THEIR FUTURE AS A FOOD AND FEED CROP.
F. R. Senti.
Soybean Dig. 23(3): 16-20. January 1963.

A survey of the present and potential markets for both the oil and meal fractions of soybeans.

- 1482 * NEW INFORMATION ON COMPOSITION AND NUTRITIVE PROPERTIES OF CORN.
J. S. Wall, R. J. Dimler, and F. R. Senti.
Proc. Symp. What's New in Production, Composition, and Utilization of Corn, sponsored by Midwest Section, Am. Assoc. Cereal Chem., January 10, 1961, Chicago, Ill., pp. C-1-C-11. December 1962.

Some recent developments are reviewed in our studies on certain components of corn that are important in human and animal nutrition. Fractionation and characterization of the corn proteins and iron protein nitrogen compounds are described, as is the isolation from corn of a substance containing nutritionally unavailable niacin. Also discussed are breeding experiments leading to corn of higher carotenoid content than originally found.

- 1483 ANALYSES OF SEED SAMPLES FROM 113 PLANT FAMILIES.
F. R. Earle and Quentin Jones.¹ (¹USDA Crops Research Div., Beltsville, Md.)
Econ. Botany 16(4): 221-250. October/December 1962.

In examining plant seeds for constituents of possible industrial value, 1,418 samples from over 900 species in 501 genera were analyzed for oil and protein contents. On many samples, analyses were made for ash, nitrogen solubility in alcohol or trichloroacetic acid, and oil constituents that react with HBr. Qualitative tests were also made on

many samples for starch (iodine), alkaloids (Wagner's reagent), tannin (ferric chloride), cyclopropenoid acids in the oil (Halphen test), and for type of infrared absorption of the oil.

1484 A SEARCH FOR NEW FIBER CROPS. PART VII. AN ECONOMIC ASSESSMENT.

W. K. Trotter.¹ (¹USDA Econ. Res. Serv., Peoria, Ill.)

Tappi 45(12): 915-919. December 1962.

Preliminary estimates on potential annual pulp crops suitable for the North Central States were developed for: (1) Costs of growing, harvesting, and transporting annual crop materials, (2) a range in value of the materials delivered to the pulp mill, and (3) the per acre yields required to equal returns from corn and wheat on lands of three different productivity levels. Yields required ranged from 2.1 tons an acre, comparing annual pulp crops at \$18 a ton to wheat on land yielding 15 bushels per acre, to 10.3 tons per acre, comparing pulp crops at \$12 a ton to corn on land yielding 80 bushels per acre.

1485 KINETICS OF LINOLENATE HYDROGENATION.

H. J. Dutton.

J. Am. Oil Chemists' Soc. 40(1): 35-39. January 1963.

The reduction of linolenate by heterogeneous catalysis and by homogeneous reaction with hydrazine is significant to food uses of soybean oil and to potential industrial applications of linseed oil. Recent studies of these two types of reduction are reviewed in terms of intermediates formed and reaction rates. The resolution and analysis of isologues and isomers were achieved by a variety of analytical, preparative, and plant-scale procedures, including isotopic dilution; infrared, ultraviolet, and mass spectrometry; column and capillary gas chromatography; countercurrent distribution with the argentation solvent system; fractional crystallization; and liquid-liquid extraction. Application of this basic information to flavor stabilization of soybean oil and to production of dibasic acids from linseed oil is discussed.

1486* DETERMINATION OF CHROMIUM AND LEAD IN PERIODIC ACID SOLUTION AND DIALDEHYDE STARCH.

L. T. Black, E. B. Lancaster, and H. G. Maister.

Cereal Chem. 40(1): 66-71. January 1963.

Two existing methods have been improved and adapted for the determination of chromium or lead in either periodic acid oxidant solution or dialdehyde starch. Because a periodic acid solution destroys color-producing reagents by oxidation, a procedure was developed to remove all the periodic acid before analyses were carried out. The intensity of the colors produced by the different reagents was measured in a spectrophotometer. A standard solution of dichromate gave a least squares slope of 2.02 ppm. per absorbance unit with a standard deviation from regression of 0.028. Lead gave a slope of 3.57 ppm. per absorbance unit with a standard deviation from regression of 0.048.

1487 TOXICITY OF TALL FESCUE FORAGE: A REVIEW.

Shelly G. Yates.

Econ. Botany 16(4): 295-303. October/December 1962.

Tall fescue (Festuca arundinacea Schreb.) is a forage having valuable agronomic characteristics. Cattle grazing on fescue are sometimes affected with "fescue foot," a noninfectious disease characterized by lameness in the hindquarters and dry gangrene of the hooves and tail. The syndrome resembles, but is not identical to, ergot or selenium poisoning. Horses, swine, and laboratory animals are not susceptible. Comparison of the major components of toxic and nontoxic fescue shows no significant differences. Cattle bioassay has shown that toxicity is retained in hay made from toxic forage and that the toxin(s) may be extracted with 80% ethanol. Animals rarely respond to medical treatment, but they usually recover if removed from the pasture. (38 references)

1488 * SOYBEAN PROTEINS--EXTRACTION, ISOLATION, AND PROPERTIES.

Allan K. Smith.

Proc. Symp. What's New in Products from the Soybean, sponsored by Midwest Section, Am. Assoc. Cereal Chem., April 3, 1961, Chicago, Ill., pp. 4-17, plus 6 figures. [1962]

A new surge of interest in soybean concentrates and isolated protein for foods has led to the development of a new area of food science and technology. To help supply needed information, the solubility and physical properties important in using soybean meal and its fractions in foods are reviewed. These properties include solubility of the proteins in water, dilute acid, or alkaline solutions; sedimentation values for some of the proteins; and their amino acid composition.

1489 MODIFICATION OF THE POLARIMETRIC STARCH DETERMINATION ON HIGH-AMYLOSE CORN.

R. A. Anderson and D. E. Uhl.

Cereal Chem. 40(1): 87-88. January 1963.

High-amylose corn must be ground to 60 mesh to obtain comparable results with the polarimetric method of determining starch content of cereal grains. Uranyl acetate was used in place of stannic chloride.

1490 STRUCTURE OF HANSENULA CAPSULATA NRRL Y-1842 PHOSPHOMANNAN.

M. E. Slodki.

Biochim. Biophys. Acta 69(1): 96-102. January 1963.

Di- and trisaccharide phosphomonoesters have been isolated after mild acid hydrolysis of the phosphomannan produced by Hansenula capsulata NRRL Y-1842. Periodate oxidation studies on both the oligosaccharide phosphates and the intact polymer have served to elucidate further the polymeric structure. The disaccharide ester has been characterized as 2-O-(6-O-phosphoryl- β -D-mannopyranosyl)-D-mannose; the trisaccharide ester appears to contain an additional mannose residue α -1,2-linked to the phosphorylated moiety of the disaccharide. The biosynthetic implications of these findings are discussed.

1491 RESEARCH ON EMULSION PAINTS FROM VEGETABLE OILS.

J. C. Cowan and L. E. Gast.

Am. Paint J. 47(33): 85, 88, 89, 92, 94, 96, 98, 100, 102, 104. February 1963.

Recent research at the Northern Division, in cooperation with the National Flaxseed Processors Association, has demonstrated that satisfactory emulsion paints containing bodied linseed oils can be prepared and are stable when stored up to 3 years at 25°C. To develop these paints, more information had to be obtained regarding the factors that are important in preparing emulsion paints from vegetable oils. Nonionic emulsions, reactive emulsifiers, chelated driers, interactions of zinc oxide and titanium oxide pigments, and properties of the emulsion paints have been studied.

1492 * CEREAL PRODUCTS IN PAPERMAKING.

F. R. Senti.

Proc. First Natl. Conf. Wheat Util. Research, sponsored by National Association of Wheat Growers; Western and Northern Utilization Research and Development Divisions and other agencies of the U. S. Department of Agriculture; the Nebraska Wheat Commission, Wheat Growers, and State Experiment Station; Western Wheat Associates; and Great Plains Wheat, Inc., Lincoln, Neb., pp. 49-64. October 29-31, 1962.

Cereal products contribute in many ways to the properties of paper and aid in its manufacture. Surface sizings, coatings, and adhesives are but a few of their applications. In seeking greater industrial uses for cereal starches and flours several new developments have been made by the Northern Division. Incorporating dialdehyde starch or some of its modified forms in a pulp slurry increases both wet and dry tensile strength of the finished sheet. These starches also greatly improve the modulus of rupture, as well as tensile strength, of insulating boards. Wheat flour, chemically modified with acid and gas, has proved satisfactory on a pilot-plant scale as a paper sizing and coating adhesive. A new cereal grain derivative which gives improved properties to paper and paper products has been developed in cereal xanthides, which are made by reacting cereal starch, flour, or middlings with sodium hydroxide and carbon disulfide followed by crosslinking through oxidation. Problems remain to be solved for these new products, but definite progress is being made toward their ultimate widespread use.

1493 * MORE VERSATILE WHEAT FLOURS BY AIR CLASSIFICATION.

E. L. Griffin.

Proc. First Natl. Conf. Wheat Util. Research, sponsored by National Association of Wheat Growers; Western and Northern Utilization Research and Development Divisions and other agencies of the U. S. Department of Agriculture; the Nebraska Wheat Commission, Wheat Growers, and State Experiment Station; Western Wheat Associates; and Great Plains Wheat, Inc., Lincoln, Neb., pp. 109-120. October 29-31, 1962.

Flour fractionation by fine grinding and air classification can aid in the control of composition and properties of flours produced from available wheats, by adjustment of protein content and granularity. By selecting the proper fractions industrial starch products can be made from soft wheats; bread and cake flours can be made from low-protein hard wheats; and improved cake, cookie, and cracker flours, and a high-protein fraction for flour fortification can be made from high-protein soft wheats. Flour fractionation allows production of more uniform products from wheats of varying composition, and it can save transportation costs for blending wheats and cross shipping of flours. Response to

fractionation represents a new aspect of wheat quality to be considered. Since it permits adjustment in protein level, it places somewhat less importance on the level but increases emphasis on the quality of the protein.

1494 GLUTEN--THE KEY TO WHEAT'S UTILITY.

R. J. Dimler.

Proc. First Natl. Conf. Wheat Util. Research, sponsored by National Association of Wheat Growers; Western and Northern Utilization Research and Development Divisions and other agencies of the U. S. Department of Agriculture; the Nebraska Wheat Commission, Wheat Growers, and State Experiment Station; Western Wheat Associates; and Great Plains Wheat, Inc., Lincoln, Neb., pp. 88-95. October 29-31, 1962.

Baker's Dig. 37(1): 52-57. February 1963.

The importance of wheat gluten in bread baking and potential industrial utilization is reviewed briefly. Recent progress, particularly at the Northern Division, in basic research on gluten proteins is discussed.

1495 CURRENT STATUS OF SOYBEAN UTILIZATION RESEARCH UNDER P.L. 480.

Frederic R. Senti.

Soybean Dig. 23(7): 28, 30-34. May 1963.

Report of progress on 17 projects, activated in 7 different countries, and objectives of another 10 projects that are being prepared or negotiated with foreign institutions. Some specific fields covered are polymerized soybean oil, meal constituents, Oriental fermented foods, and flavor components.

1496 COMPOSITION OF OILSEEDS. A LIST OF PUBLICATIONS AND PATENTS FOR 1962.

North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U.S. Dept. Agr.

ARS-71-23-1. January 1963. 3 p. [Processed]

A yearly supplement to a 25-year bibliography on this research work.

1497 PROCESSING OILSEEDS, OIL, AND MEAL. A LIST OF PUBLICATIONS FOR 1962.

North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U.S. Dept. Agr.

ARS-71-24-1. January 1963. 1 p. [Processed]

A yearly supplement to a 25-year bibliography on this research work.

1498 EDIBLE SOYBEAN OIL. A LIST OF PUBLICATIONS FOR 1962.

North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U.S. Dept. Agr.

ARS-71-25-1. January 1963. 2 pp. [Processed]

A yearly supplement to a 25-year bibliography on this research work.

1499 EDIBLE SOYBEAN PROTEIN PRODUCTS. A LIST OF PUBLICATIONS AND PATENTS FOR 1962.

North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U.S. Dept. Agr.

ARS-71-26-1. January 1963. 2 pp. [Processed]

A yearly supplement to a 25-year bibliography on this research work.

1500 CHEMICALLY MODIFIED OIL PRODUCTS AND INDUSTRIAL USES. A LIST OF PUBLICATIONS AND PATENTS FOR 1962.

North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U.S. Dept. Agr.

ARS-71-27-1. January 1963. 4 pp. [Processed]

A yearly supplement to a 25-year bibliography on this research work.

- 1501 INDUSTRIAL USES OF PROTEINS. A LIST OF PUBLICATIONS FOR 1962.
North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U. S. Dept. Agr.
ARS-71-28-1. January 1963. 1 p. [Processed]

A yearly supplement to a 25-year bibliography on this research work.

- 1502 REVIEW ARTICLES ON OILSEED CROPS RESEARCH. A LIST OF PUBLICATIONS FOR 1962.
North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U. S. Dept. Agr.
ARS-71-29-1. January 1963. 1 p. [Processed]

A yearly supplement to a 25-year bibliography on this research work.

- 1503 NEW CROPS. A LIST OF PUBLICATIONS AND PATENTS FOR 1962.
North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U. S. Dept. Agr.
ARS-71-19-1. February 1963. 4 pp. [Processed]

A yearly supplement to a previous bibliography on this research work.

- 1504 MONITORING GAS CHROMATOGRAPHY FOR H^3 - AND C^{14} -LABELED COMPOUNDS BY LIQUID SCINTILLATION COUNTING.

Herbert J. Dutton.

"Advances in Tracer Methodology," ed. Seymour Rothchild, vol. 1, pp. 147-152. New York. 1963.

Manual and automatic procedures are described to condense radioactive compounds in effluent streams from gas chromatographic instruments into scintillation solutions. Fractions collected from low-specific activity experiments may be counted over periods of time sufficient to attain desired statistical accuracy.

- 1505 HYDROGENATION OF LINOLENATE. FRACTIONATION OF ISOMERIC ESTERS BY COUNTER-CURRENT DISTRIBUTION WITH AN ARGENTATION SYSTEM.
C. R. Scholfield, E. P. Jones, R. O. Butterfield, and H. J. Dutton.
Anal. Chem. 35(3): 386-389. March 1963.

Methyl linolenate was hydrogenated to an iodine value of 153.5 with 0.5% nickel catalyst at 140°C. and atmospheric pressure. The product was separated into monoenoic, dienoic, and trienoic esters by countercurrent distribution using acetonitrile and petroleum ether. Each of these fractions was countercurrently distributed between 0.2N silver nitrate in 90% methanol and petroleum ether. cis-Monoenes were well separated from trans-monoenes. In the diene fraction, separation was less complete because there were differences in both configuration and relative position of double bonds. Analysis of the fractions by such methods as infrared absorption, alkali and lipoxidase isomerization, and oxidative cleavage, followed by dibasic acid analysis, gave additional information about the products formed during hydrogenation of linolenate.

- 1506 * AMADORI REARRANGEMENT PRODUCTS.
J. E. Hodge and B. E. Fisher.
"Methods in Carbohydrate Chemistry," vol. II, pp. 99-107. New York. 1963.

Procedures are given for preparing Amadori rearrangement products for specific classes of amines to yield the corresponding 1-deoxy-1-amino-ketose. The classes of amines are: ammonia; primary alkyl and aralkylamines; secondary alkyl, alkylidene, and aralkylamines; secondary alkyl aryl amines; aromatic amines; and amino acids.

- 1507 AMINO ACIDS IN THE HAEMOLYMPH OF POPILLIA JAPONICA (NEWMAN) LARVAE.
Odette L. Shotwell, Glenn A. Bennett, Harlow H. Hall, Cecil H. VanEtten,
and Richard W. Jackson.
J. Insect Physiol. 9(1): 35-42. January/February 1963.

The proteins were separated from the acid-soluble components in haemolymph of Popillia japonica (Newman) larvae with 5% trichloroacetic acid, and the resulting materials analyzed for amino acid content. Altogether 20 amino acids were identified in whole or hydrolyzed haemolymph or in fractions. Analysis was done by paper chromatography and ion exchange chromatography. Glutamine, arginine, histidine, proline, glycine, alanine, and valine occur free in considerable amounts in the haemolymph. Lysine, aspartic acid, threonine, serine, glutamic acid, isoleucine, leucine, tyrosine, β -alanine, tryptophan, and asparagine were also detected.

Sixteen amino acids were identified in the insoluble proteinaceous material. Phenylalanine and methionine were present in the insoluble fraction, but not to an appreciable extent in any other fractions. There were several peptides that disappeared on acid hydrolysis. There were at least two unidentified ninhydrin-reacting substances that were stable to acid.

- 1508 REACTIONS OF UNSATURATED FATTY ALCOHOLS. XV. STYRENEATION OF FATTY VINYL ETHER POLYMERS IN TERPENE SOLVENTS.
L. E. Gast, Wilma J. Schneider, H. M. Teeter, G. E. McManis, and J. C. Cowan.
J. Am. Oil Chemists' Soc. 40(3): 88-91. March 1963.

Styreneation of fatty vinyl ether polymers in dipentene gives products containing from 20-67% styrene by weight, but little or no unreacted monomeric styrene remained. After 27 months no gelation occurred in these products. Apparently dipentene serves as an effective chain transfer agent during styreneation, keeps the growing polymer chains short, and reduces crosslinking reactions. The amount and type of unsaturation needed in the fatty side chains of the polymer to produce homogeneous products were studied. Ultraviolet and infrared analyses were useful in determining the function of unsaturation in these reactions.

Tests on baked films from these products showed that as the amount of styrene was increased, both hardness and alkali resistance were significantly increased. Films prepared from products containing 34 and 67% styrene had Sward hardness values of 10 and 60, and alkali resistance of 33 days and over 65 days, respectively. Films from products prepared in aromatic solvents versus dipentene at the same styrene level showed no difference in hardness, but alkali resistance of the "dipentene film" was greater.

- 1509 EMULSIFIERS DERIVED FROM LINSEED OIL AND THEIR POTENTIAL USE IN COATINGS.
W. L. Kubie, J. L. O'Donnell, H. M. Teeter, and J. C. Cowan.
J. Am. Oil Chemists' Soc. 40(3): 105-107. March 1963.

In the development of a stable linseed oil emulsion paint, a series of emulsifiers were prepared from linseed oil and its fatty acids and alcohols: (1) linseed monoglycerides, (2) mono- and dilinseed fatty sorbitan esters and a mixed ester obtained by the transesterification of linseed oil with sorbitol, (3) polyoxyethylene ether adducts formed

by reacting ethylene oxide with these sorbitan esters, and (4) linseed polyoxyethylene ether made by ethoxylation of linseed alcohols. Another series of surfactants was prepared by esterifying a polyoxyethylene ether of sorbitol with various amounts of linseed fatty acids. Conditions of preparation and pertinent physical and chemical properties of the emulsifiers are given.

Some of these emulsifiers demonstrated film-forming properties. Combinations were formulated into linseed oil emulsion paints with and without zinc oxide. Paints containing zinc oxide have been relatively stable in viscosity for about 2 years.

1510 AMINO ACID COMPOSITION OF SAFFLOWER KERNELS, KERNEL PROTEIN, AND HULLS, AND SOLUBILITY OF KERNEL NITROGEN.

C. H. VanEtten, J. J. Rackis, Roger W. Miller, and A. K. Smith.
J. Agr. Food Chem. 11(2): 137-139. March/April 1963.

Safflower seed kernel (seed without seed coat) and hull (seed coat and pericarp) containing 60% and 3% crude protein, respectively, and isolated crude kernel protein were analyzed for amino acid composition by column chromatographic methods. Methionine, cystine, lysine, and tryptophan were present in the kernel in amounts of 1.5, 1.7, 3.2, and 0.9 grams per 16 grams of nitrogen, respectively. Comparison of the seed kernel with seed from other plant species showed arginine and valine content to be high and lysine content low. Hydroxyproline was present in the hull. An isolated crude protein was prepared by precipitation of alkali-soluble protein at pH 4. One hundred grams of dry, defatted, kernel meal gave a laboratory yield of 45 grams of the crude protein. Amino acid composition of this crude protein was similar to that of the kernel. The solubility of the kernel nitrogen as related to pH of the extract was determined.

1511* METAL CHELATION BY GLUCOSE-AMMONIA DERIVATIVES.

J. E. Hodge, E. C. Nelson, and B. F. Moy.
J. Agr. Food Chem. (11)2: 126-129. March/April 1963.

The sequestration of cupric, calcium, strontium, and ferric ions by D-glucose, sorbitol, maltose, gluconate, glucoheptonate, saccharate N-methylglucamine, mono- and di-D-glucosylamines and their derivatives was measured in neutral to strongly alkaline solutions. Relatively large amounts of multivalent metal ion were sequestered by two new glucose-ammonia derivatives--disorbitylamine and the anhydro enolization product of di-D-glucosylamine. The results are discussed in terms of carbohydrate structure and metal chelation theory; and some possible benefits to agriculture are indicated.

1512 THIN-BOILING STARCHES FROM THE REACTION OF CORN STARCH WITH CHLORINE IN METHANOL.

W. C. Schaefer, C. R. Russell, Judith J. Maurice, and C. E. Rist.
Cereal Chem. 40(2): 101-109. March 1963.

Corn starch was slurried in approximately an equal weight of methanol and reacted with chlorine at concentrations up to 5%, based on methanol, for periods up to 2 hours and at temperatures ranging from 25°-65°C.

In the light of previous experience with dialdehyde starches, these reaction conditions would be expected to introduce methyl and carboxyl groups into the resulting products, but none could be detected by existing analytical procedures.

By varying temperature, reaction time, and amount of chlorine, thin-boiling starches were produced that had intrinsic viscosities ranging from 1.53-0.06 in 1 N potassium hydroxide. These products and commercial thin-boiling starches having similar intrinsic viscosities were compared for several paste properties. The new starches had lower alkali numbers, similar pasting temperatures, higher paste viscosities and setback, and slightly lower paste clarities. Unsupported films of the new products were stronger.

1513 VACUUM-TEMPERING CORN FOR DRY-MILLING.

L. A. Weinecke, O. L. Brekke, and E. L. Griffin, Jr.
Cereal Chem. 40(2): 187-191. March 1963.

Insufficient tempering capacity in commercial plants frequently hinders dry-milling of corn. The possibility of improved tempering by use of a vacuum was investigated. Laboratory studies showed that 14%-moisture corn, immersed in water and subjected first to 5- to 25-inch Hg vacuum and then to atmospheric pressure for 1 to 5 minutes, increased to 20% moisture compared to 16% for the control sample.

Three pilot-plant runs in a Beall degerminator with 13%-moisture corn, vacuum-tempered to 21% (3% of which was surface moisture) (1 minute at 5-inch vacuum and 9 minutes at atmospheric pressure under water, then 10 minutes' drainage and rest time) were compared with one on corn given a conventional temper for 1 hour. With the 20-minute vacuum-tempered corn, throughput, hull, and oil recovery were reduced; -4+6 grits of lower fat content and fewer attached hulls were obtained in increased yield along with fewer -6+8 grits.

1514 POLYOXYETHYLENE ETHERS OF SOME POLYOL GLYCOSIDES AND THEIR FATTY ESTERS.

F. H. Otey, C. L. Mehlretter, and C. E. Rist.
J. Am. Oil Chemists' Soc. 40(2): 76-78. February 1963.

Starch heated with a polyol, such as ethylene glycol, propylene glycol, or glycerol, in the presence of an acid catalyst undergoes transglycosidation and forms a mixture of polyol glycosides. This mixture is sufficiently heat-stable to permit polyetherification with ethylene oxide. The preparation and properties of a number of glycoside polyoxyethylene ethers are described.

Nonionic emulsifying agents were prepared by reacting glycoside polyethers with either saturated or unsaturated long-chain fatty acids and with linseed oil. In general, the esterified glycoside polyethers exhibited good emulsifying action, and the unsaturated esters of the polyethers possessed film-forming properties.

1515 HYDROGENATION OF LINOLENATE. VII. SEPARATION AND IDENTIFICATION OF ISOMERIC DIENES AND MONOENES.

B. Sreenivasan, Janina Nowakowska, E. P. Jones, E. Selke, C. R. Scholfield, and H. J. Dutton.
J. Am. Oil Chemists' Soc. 40(2): 45-51. February 1963.

Isomeric dienes and monoenes produced by partial hydrogenation of linolenic acid have been separated by the combined use of low-temperature crystallization and countercurrent distribution. cis,trans Dienes have been separated from cis,cis dienes. cis,cis Conjugable dienes have been partially separated from cis,cis nonconjugable dienes. Dienes with one trans double bond were separated by gas chromatography into two groups: cis,trans and trans,cis. Individual positional isomers could not be separated.

1516 CYCLIC FATTY ACID YIELDS FROM LINSEED OIL.

R. A. Eisenhauer, R. E. Beal, and E. L. Griffin.

J. Am. Oil Chemists' Soc. 40(4): 129-131. April 1963.

Increased yields of saturated cyclic fatty acids that are fluid at -50°C . were obtained from linseed oil. Depending on reaction conditions, yields varied from 20-42 grams of cyclic acids per 100 grams of linseed oil. Solvent ratios of 6, 3, and 1.5 to 1; catalyst concentrations of 10, 30, 60, and 100%; and reaction temperatures of 225° , 275° , 295° , and 325°C . were evaluated. Ethylene glycol and diethylene glycol were compared as reaction solvents. In general, high solvent ratios favored high cyclic-acid yields at the lower reaction temperature, but as the temperature increased the effect of solvent ratio decreased. Increasing the percentage excess of sodium hydroxide increased cyclic acid yield. Diethylene glycol gave higher yields than ethylene glycol at comparable conditions.

1517 REACTIVITY OF ZINC OXIDE AND TITANIUM DIOXIDE IN THE PRESENCE OF DISPERSING AGENTS.

L. H. Princen and Marilyn J. DeVena.

J. Am. Oil Chemists' Soc. 40(4): 131-135. April 1963.

The effect of various dispersing agents on the interaction between zinc oxide and titanium dioxide in water was investigated. Addition of conventional dispersing agents to suspensions of zinc oxide and titanium dioxide reduces initial viscosities but increases the rate of interaction; however, ethylene glycol reduced interaction. Higher concentrations of dispersing agents caused foaming of the suspensions and caking of the pigments. If organic dispersing agents are replaced by inorganic phosphates, pigment interactions, foaming, and caking can be prevented in suspensions containing as much as 61% solids by weight.

1518 VINYL MONOMERS DERIVED FROM FATS AND OILS.

H. M. Teeter.

J. Am. Oil Chemists' Soc. 40(4): 143-156. April 1963.

Preparation, properties, and uses of monomers containing saturated or unsaturated C_{12-18} fatty radicals derived from fats and oils and capable of polymerization or copolymerization by vinyl-type mechanisms are reviewed. Principal monomers discussed are vinyl esters and ethers, acrylic esters, allylic esters and ethers, and α -olefins.

1519 DISCUSSION II [on the Organization of a Type Culture Collection by J. M. Shewan, Torry Research Station, Aberdeen, Scotland].

William C. Haynes.

In "Culture Collections: Perspectives and Problems," Proc. Specialists' Conf. on Culture Collections, August 1962, Ottawa, ed. S. M. Martin, pp. 36-39. 1963.

This invited discussion was presented as part of one of the symposiums making up the first international Specialists' Conference, sponsored by the Canadian Committee on Culture Collections of Micro-organisms, an associate committee of the National Research Council of Canada.

- 1520 A STUDY OF RHOPALOMYCES ELEGANS IN PURE CULTURE.
J. J. Ellis.
Mycologia 55(2): 183-198. March/April 1963.

A neotype for the fungus Rhopalomyces elegans Corda is proposed and described from pure culture; also two new varieties are described. All three parasitized eggs of the nematode Rhabditis sp. Two strains of Bacillus cereus stimulated abundant spore germination on a medium containing tryptone, dibasic potassium phosphate, and yeast extract at an elevated pH. Strains of Rhopalomyces elegans grew well at 20°-28°C. The results of growth experiments and the morphology of R. elegans indicate that it is a highly specialized parasitic fungus. Evidence is presented for placing the genus in the Mucorales.

- 1521 * RESEARCH ON LINSEED OIL AT NORTHERN REGIONAL RESEARCH LABORATORY.
J. C. Cowan.
Proc. 32nd Annual Flax Inst. U. S., Minneapolis, Minn., pp. 26-28.
November 1962.

Linseed oil research has been expanded into two new areas: Coating of concrete with linseed oil to help prevent spalling and preparing water-soluble vehicles from linseed oil. Preliminary results on both are encouraging. Significant progress has also been made on the stability of emulsion paints, which are now in commercial production.

- 1522 ENHANCEMENT OF β -CAROTENE SYNTHESIS BY CITRUS PRODUCTS.
Alex Ciegler, George E. N. Nelson, and Harlow H. Hall.
Appl. Microbiol. 11(2): 128-131. March 1963.

β -Ionone, a stimulatory compound in the microbiological production of β -carotene by mated cultures of Blakeslea trispora, could be replaced with low-cost agricultural byproducts (citrus oils, citrus pulp, or citrus molasses) with as good or better carotene yields. Peak yields (81-129 mg. of carotene per gram of dry solids) were achieved in 5 days. The various citrus products tested did not change the pigments produced; all trans- β -carotene remained the predominant pigment. The acid-hydrolyzed soybean meal and corn used in previous production media could be replaced with unhydrolyzed cottonseed embryo meal and corn in a medium that also contained a natural lipid, deodorized kerosene, nonionic detergent, and a precursor.

- 1523 OXIDATION OF GLUCOSE TO γ - AND δ -GLUCONOLACTONE BY MICROBIAL ENZYMES.
Ralph Weimberg.
Biochim. Biophys. Acta 67(3): 359-365. March 1963.

The product of glucose oxidation by three particulate and two soluble glucose-oxidizing enzymes was determined. The particulate enzymes yield glucono- γ -lactone, whereas the soluble ones produce glucono- δ -lactone.

- 1524 STUDIES WITH A CONSTITUTIVE ALDOSE DEHYDROGENASE IN PSEUDOMONAS FRAGI.
Ralph Weimberg.
Biochim. Biophys. Acta 67(3): 349-358. March 1963.

Pseudomonas fragi contains a constitutive, particulate aldose dehydrogenase. The enzyme oxidizes its sugar substrates to the γ -lactone of the corresponding aldonic acids. An investigation of properties of the enzyme showed that all substrates are oxidized by a single enzyme. Although the enzyme is constitutive, seemingly growth is not correlated with oxidation of the sugar but rather with metabolism of the product of oxidation, i.e., the sugar acid. The enzymes oxidizing the sugar acids and D-arabinose have different properties from those of the aldose dehydrogenase. These enzymes are soluble, formed by induction, and highly specific for their individual substrates.

- 1525 * D-FRUCTOFURANOSE 1,3,4,6-TETRABENZOATE. DIRECT BENZOYLATION OF D-FRUCTOSE.
J. W. Van Cleve.
"Methods in Carbohydrate Chemistry," vol. II, pp. 237-238. New York, 1963.

Two modifications are described to the procedure to prepare D-fructofuranose 1,3,4,6-tetrabenzoate, a useful intermediate from which to make D-fructofuranose derivatives, by direct benzylation of D-fructose in pyridine. The modifications are: (1) Maintaining the temperature of the reaction mixture at 60°-65°C. and (2) removing all hydrogen chloride from the crude product before its recrystallization from ethanol. With these modifications the yield is consistently good and reproducible.

- 1526 RAMULOSIN FERMENTATION.
C. W. Hesseltine, C. R. Benjamin, Barbara Bradle, and W. F. Hendershot.
Am. J. Botany 50(3): 209-213. March 1963.

A nonsporulating strain of Pestalotia ramulosa v. Beyma NRRL 2826 produces large amounts of ramulosin, a compound having a molecular formula of $C_{10}H_{14}O_3$. This compound was first observed in colonies growing on malt extract agar and was subsequently produced in large yields in still fermentation at 15°C. Although two other sporulating strains of this species fail to produce ramulosin, all three possess similar carbon and nitrogen utilization patterns. Of a number of different media tested, the best was composed of 4.0% malt extract, 4.0% glucose, and 0.1% peptone. Yields of as much as 6.2 grams of ramulosin per liter of medium have been obtained, representing 58% of the total dry weight of the culture. Ramulosin is not produced in any appreciable amounts until after most of the mycelium is formed. Ramulosin can also be produced in submerged fermentations. A sporulating form that fails to form ramulosin has been found in certain fermentations carried out at elevated temperatures.

1527 NATURE OF FESCUE TOXICITY AND PROGRESS TOWARD IDENTIFICATION OF THE TOXIC ENTITY.

D. R. Jacobson, W. M. Miller, D. M. Seath;¹ S. G. Yates, H. L. Tookey, and I. A. Wolff. (¹University of Kentucky, Lexington.)
J. Dairy Sci. 46(5): 416-422. May 1963.

Tall fescue toxicity has been experimentally produced in cattle by an extract chemically fractioned from toxic forage. The toxic fraction represents 11% of the dry matter of hay and is essentially free of lipids and certain alkaloids. Ergot, selenium, and boron have been eliminated as causes of the toxicity. A novel bioassay utilizing tail temperature is described which may be correlated to toxicity. The nature of the syndrome has been characterized by a study of symptoms and post-mortem findings. Lameness and gangrene in cold weather may give way to elevated body temperature and respiration rate as clinical symptoms of toxicity in warm weather. A vasoconstrictor is postulated as the causative agent. The study is continuing to learn the chemical identity of the toxic agent and if poor animal performance on fescue is correlated with subclinical levels of toxicity.

1528 COST OF PRODUCING LINOLEIC ACID FROM SAFFLOWER OIL.

V. E. Sohns, R. E. Beal, and E. L. Griffin, Jr.
J. Am. Oil Chemists' Soc. 40(5): 169-172. May 1963.

Linoleic acid of 97% purity can be made from safflower oil by liquid-liquid extraction at a "cost to make" of about 21 cents a pound. Calculations for the cost estimate are based on pilot-plant investigations. Fixed capital investment for a plant with an annual capacity of 20 million pounds is estimated at approximately \$1,800,000. Such a plant could be converted readily to the production of a variety of other fatty acids.

1529 HYDRAZINE-REDUCED LINOLENIC ACIDS AS A SOURCE OF C₉, C₁₂, AND C₁₅ DIBASIC ACIDS.

H. J. Dutton, C. R. Scholfield, E. P. Jones, E. H. Pryde, and J. C. Cowan.
J. Am. Oil Chemists' Soc. 40(5): 175-179. May 1963.

Anticipated reduction in cost of hydrazine, resulting from its increased production as a rocket fuel, suggests the need to reconsider this chemical as an industrial reactant for fats. Hydrazine reduces the individual double bonds of linolenic acid (9,12,15-octadecatrienoic acid) nonselectively and without altering the position of residual unsaturation; thus the monoene fraction from hydrazine-reduced linolenic acid consists of an equimixture of the 9-, 12-, and 15-octadecenoate acids. Equal amounts of the C₉, C₁₂, and C₁₅ dibasic acids are derived from this fatty acid mixture by oxidative cleavage along with the corresponding monobasic acids.

Kinetics of reactions, source of raw materials and reactants, and problems of processing and utilization of products are discussed.

- 1530 CASEIN-DIALDEHYDE STARCH ADHESIVE FOR WOOD.
F. B. Weakley, M. Louise Ashby, and C. L. Mehlretter.
Forest Prod. J. 13(2): 51-55. February 1963.

Various formulations of casein with the nonvolatile polyaldehyde dialdehyde starch (DAS), were evaluated as wood adhesives. Factors studied included the use of dry or solubilized DAS in adhesive formulations, ratio of casein to DAS, and pH of adhesive mixture.

Adhesive formulations prepared under acidic conditions with solubilized DAS and applied to yellow birch panels set within 5 minutes under cold-press with development of good dry strength. The plywood exhibited maximum shear strength at approximately 20% moisture content following exposure at 77°F. Original dry shear strength and wet strength, following 48 hours of continuous soaking in cold water, surpassed reported commercial casein-glue bond values. The casein-DAS bond also resisted delamination in boiling water. Glue lines of yellow birch plywood bonded with casein-DAS adhesive were hard and inconspicuous, and the panels were free from stain.

- 1531 PYRUVIC ACID CONTENT AND CONSTITUENT SUGARS OF EXOCELLULAR POLYSACCHARIDES FROM DIFFERENT SPECIES OF THE GENUS XANTHOMONAS.
Danute G. Orentas, J. H. Sloneker, and Allene Jeanes.
Can. J. Microbiol. 9(3): 427-430. June 1963.

Exocellular polysaccharides produced by eight different species of Xanthomonas and one unidentified strain of Pseudomonas contained pyruvic acid varying in amount from a low of 1.05% to a high of 7.64%. A keto acid different from pyruvic acid was present in the polysaccharide from a second unidentified Pseudomonas organism. All the Xanthomonas organisms produced acidic polysaccharides containing glucuronic acid, glucose, and mannose, except the X. vesicatoria polysaccharide, which had galactose instead of mannose. Sugar components in the two Pseudomonas polysaccharides were the neutral ones: glucose, mannose, and galactose.

- 1532 NOTE ON THE PREPARATION AND USE OF POLY-2-VINYLPYRIDINE-SULFUR TRIOXIDE AS A SULFATING AGENT FOR STARCH.
H. E. Smith, C. R. Russell, and C. E. Rist.
Cereal Chem. 40(3): 282-285. May 1963.

Poly-2-vinylpyridine-sulfur trioxide is a novel polymeric sulfating agent for unmodified and modified starches. Aqueous dispersions of the starch sulfates give pastes that are quick-setting and that exhibit unusual tackiness and adhesive characteristics.

- 1533 PREPARATION OF ACID-MODIFIED FLOURS FOR TUB SIZING.
E. B. Lancaster, L. A. Pope, and E. L. Griffin, Jr.
Cereal Chem. 40(3): 269-276. May 1963.

Soft white winter wheat flour was reacted with small amounts of 4 N hydrochloric acid in a ribbon mixer to produce 30-pound batches of a material similar to commercial products in paste viscosity and effectiveness as a tub-sizing agent. Although viscosity specifications were met

by blending, viscosity varied from run to run with spraying quality, temperature, time, and acid concentration. An acid-modified flour was also prepared from gaseous hydrogen chloride.

1534 AN EXAMINATION OF ANTHOCYANOGENS IN GRAIN SORGHUMS.

C. W. Blessin, C. H. VanEtten, and R. J. Dimler.
Cereal Chem. 40(3): 241-250. May 1963.

Anthocyanogens (leucoanthocyanins) were detected in yellow milo and red kafir sorghums but not in white kafir, waxy, and yellow-endosperm varieties. When present, these compounds are located mainly in the pericarp and are generally absent from the endosperm. The anthocyanogens in aqueous extracts of the whole grain were isolated by a procedure based on adsorption by strongly basic ion exchange resins. Spectral data on the purified material in neutral, acidic, and basic solvents are discussed. The usual methods for converting anthocyanogens to anthocyanidins were not applicable. Fisetinidin was tentatively identified as one of the reaction products resulting from treatment of the anthocyanogens with 12 N hydrochloric acid at room temperature. Spectral data on the purified material at various oxidation stages are presented.

1535 FOREIGN USES OF SOYBEAN PROTEIN FOODS.

Allan K. Smith.
Cereal Sci. Today 8(6): 196, 198, 200, 210. July 1963.

United States production of soybeans for 1961 (693 million bushels) was about 60% of world production. About 25% of this crop will be exported as whole beans, an additional 20% as oil, and approximately 650,000 metric tons of defatted meal.

Japan imports increasing amounts of U. S. soybeans for use in such traditional foods as fresh and dried tofu, aburage, and miso. Selected varieties of U. S. beans are gaining favor in these foods over ordinary No. 2 grade beans, although the major production of tofu, miso, natto, hamanatto, and other lesser known foods is still from domestic beans. An increase in our soybean exports to Japan and other countries can be greatly assisted by research on foreign foods.

Japan is seeking not only to improve production methods and quality of its traditional foods, but also to develop new soybean foods and western-type foods suitable for supplementation with soybean protein. In 1961, the Japanese started making a Gelsoy-like protein concentrate for use in frozen desserts and other foods. They are active also in developing a spray-dried extract from soybeans for feeding children and are conducting laboratory and pilot-plant studies on isolated soybean protein, yogurt, cheese, and soy protein in noodles.

1536 RECENT DEVELOPMENTS IN THE GLYCERIDE STRUCTURE OF VEGETABLE OILS.

H. J. Dutton and C. R. Scholfield.
In Progress in the Chemistry of Fats and Other Lipids. vol. 6.
R. T. Holman, W. O. Lundberg, and T. Malkin, eds. chap. 10, pp. 313-339. London. 1963.

Advances in knowledge of glyceride structure have followed closely upon advances in techniques for lipid analysis. In contrast to

earlier concepts, liquid vegetable oils appear to follow a random structure; in conformity with prior results the solid fat, cocoa butter, is constructed according to a specific pattern. Areas for future research in glyceride structure are indicated.

1537 CHROMATOGRAPHY OF QUATERNARY NITROGEN COMPOUNDS ON BUFFERED CATION-EXCHANGE RESINS.

D. D. Christianson, J. S. Wall, J. F. Cavins, and R. J. Dimler.
J. Chromatog. 10(4): 432-438. April 1963.

Quaternary nitrogen compounds and their amine analogues were separated by chromatography on columns of a uniformly sized, pulverized, sulfonated polystyrene resin using buffers for elution. Substances of biological interest thus separated and determined by the ultraviolet absorption of their periodide derivatives include betaine, stachydrine, choline, trigonelline, N-methylnicotinamide, and carnitine. Better separation of these compounds is obtained with buffered eluents than with hydrochloric acid because of greater differences in degrees of ionization in the buffer system. Corn grain extracts were rapidly analyzed by the procedure.

1538 FRACTIONATION OF GAINES WHEAT FLOUR FROM THE PACIFIC NORTHWEST.

A. C. Stringfellow, A. J. Peplinski, and E. L. Griffin, Jr.
Northwest. Miller 268(13): 34-36. June 1963.

Gaines semidwarf variety of soft white winter wheat has been developed recently to replace Omar and Brevor varieties now grown extensively in the Pacific Northwest. This new variety is similar to the other two in protein content, but it yields considerably higher quantities of grain from heavier applications of fertilizer without lodging. A sample of the new wheat was milled, and the flour was fractionated by fine grinding and air classification. The flour yielded 15% of its weight in a fraction containing 20% protein, and over 70% of its weight in a fraction containing 3.0% protein. Its response to fractionation was better than that of Omar, and nearly as good as Brevor.

1539 FATTY ACID COMPOSITION OF MATURING VERNONIA ANTHELMINTICA (L.) WILLD. SEEDS. DIHYDROXYOLEIC ACID--A POSSIBLE PRECURSOR OF EPOXYOLEIC ACID.

T. K. Miwa, F. R. Earle, Glenda C. Miwa, and I. A. Wolff.
J. Am. Oil Chemists' Soc. 40(6): 225-229. June 1963.

Quantitative measurements of epoxyoleic acid and co-occurring fatty acids in maturing Vernonia anthelmintica (L.) Willd. seeds were made to elucidate partially the mode of epoxyoleic biosynthesis. Free (+) threo-12,13-dihydroxy-cis-9-octadecenoic acid was the major component at an intermediate maturation stage and is believed to be dehydrated to free epoxyoleic acid before incorporation into glycerides.

REPUBLICATIONS

- 1083 REACTION OF UNSATURATED ORGANIC COMPOUNDS WITH TRITIUM GAS.
Herbert J. Dutton and Robert F. Nystrom.¹ (¹Radiocarbon Laboratory,
University of Illinois, Urbana.)
"Advances in Tracer Methodology," ed. Seymour Rothchild, vol. 1,
pp. 18-27. New York. 1963.

Presented at the Second Symposium on Advances in Tracer Applications
of Tritium, 1958, and published in the symposium proceedings. This
newly revised chapter includes information since 1958 on substitution
of tritium for hydrogen in unsaturated organic compounds by the
Wilzbach gas-exposure technique.

CONTRACT RESEARCH PUBLICATIONS

[Report of research work done by an outside agency under contract
with the U. S. Department of Agriculture and supervised by the Northern
Utilization Research and Development Division.]

- 108-C * SOME POLYMERS AND COPOLYMERS OF VINYL KETOSTEARATES.
C. S. Marvel, T. K. Dykstra, and F. C. Magne (SU).
University of Illinois, Urbana.
J. Polymer Sci. 62(174): 369-377. December 1962.
- 109-C* SHAPE OF A FLUID DROP AT A LIQUID-LIQUID INTERFACE.
H. M. Princen.
University of Southern California, Los Angeles.
J. Colloid Sci. 18(2): 178-195. February 1963.
- 110-C POLYMERIZATION AND COPOLYMERIZATION OF UNSATURATED FATTY ACIDS AND
THEIR ESTERS--A SURVEY OF THE LITERATURE.
F. R. Mayo and Harriette Huff.
Stanford Research Institute, Menlo Park, California.
North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U. S. Dept. Agr.
ARS-71-30. June 1963. 48 pp. [Processed]
- 111-C* PARAMETERS OF EMULSION STABILITY.
Robert D. Vold and Robert C. Groot.
University of Southern California, Los Angeles.
J. Soc. Cosmetic Chemists 14(5): 233-244. May 1963.
- 112-C POLYMERS DERIVED FROM UNSATURATED ESTERS OF HYDRONOPOXYALKANOLS.
Toshiyuki Shono and C. S. Marvel.
The University of Arizona, Tucson.
J. Polymer Sci. Part A, 1(5): 1543-1552. May 1963.

[Report of research work supported with funds provided by the U. S. Department of Agriculture under the authority of U. S. Public Law 480, 83rd Congress, and sponsored by the Northern Utilization Research and Development Division.]

- 17-PL-480 THE PROPERTIES OF WHEAT AND WAXY MAIZE STARCHES MILDLY OXIDIZED WITH SODIUM HYPOCHLORITE.
J. Schmorak and M. Lewin.
Institute for Fibres and Forest Products Research.
Ministry of Commerce and Industry, Jerusalem, Israel.
Bull. Res. Council Israel, Sect. A, 11A(3): 228-229. October 1962.
- 18-PL-480* WATER-SOLUBLE POLYPEPTIDYL GLIADINS.
Michael Sela, Noach Lupu, Arie Yaron, and Arie Berger.
The Weizmann Institute of Science, Rehovoth, Israel.
Biochim. Biophys. Acta 62(3): 594-596. August 1962.
- 19-PL-480* A STUDY OF THE MILD OXIDATION OF WHEAT STARCH AND WAXY MAIZE STARCH BY SODIUM HYPOCHLORITE IN THE ALKALINE pH RANGE.
J. Schmorak, D. Mejzler, and M. Lewin.
Institute for Fibres and Forest Products Research
Ministry of Commerce and Industry, Jerusalem, Israel.
Die Stärke 14(8): 278-290. August 1962.
- 20-PL-480* MULTICHAIN POLY- α -AMINO ACIDS.
A. Berger and A. Yaron.
The Weizmann Institute of Science, Rehovoth, Israel.
"Polyamino Acids, Polypeptides, and Proteins," ed. M. A. Stahmann, Proc. Internl. Symposium, Madison, Wisconsin, June 19-24, 1961.
pp. 13-19. Madison. 1962.
- 21-PL-480* POLYAMIDES CONTAINING CARBOHYDRATE RESIDUES.
T. P. Bird, W. A. P. Black, E. T. Dewar, and J. B. Hare.
Arthur D. Little Research Institute.
Musselburgh, Midlothian, Scotland.
J. Chem. Soc. 1963: 1208-1212. February.
- 22-PL-480 * DETERMINAZIONE MEDIANTE IL METODO ISOPIESTICO DEL PESO MOLECOLARE DI OLI TERMOPOLIMERIZZATI E DI LORO FRAZIONI.
[Molecular Weight Determination of Heat-Polymerized Oils and Their Fractions by Isobaric Methods.]
E. Fedeli, A. Arpino, and P. Capella.
Stazione Sperimentale Olii e Grassi, Milan, Italy.
Chim. Ind. (Milan) 45(2): 208-211. February 1963.
- 23-PL-480* FRACTIONATION OF SOYBEAN AND LINSEED OIL FATTY ACIDS BY CRYSTALLIZATION.
Erkki Uksila.
University of Helsinki, Finland.
Ann. Acad. Sci. Fennicae, Ser. A II (119): 74 pp. March 1963.
- 24-PL-480 ESTIMATION OF THE NUMBER AVERAGE DP OF STARCH BY THE PERIODATE METHOD.
D. Mejzler, J. Schmorak, and M. Lewin.
Institute for Fibres and Forest Products Research
Ministry of Commerce and Industry, Jerusalem, Israel.
Die Stärke 14(11): 428-432. November 1962.

PATENTS

[These patents are assigned to the Secretary of Agriculture. Copies of patents may be purchased from the U. S. Patent Office, Washington, D. C. 20231.]

PROCESS FOR PREPARING IMPROVED SIZING AGENTS FROM CEREAL FLOURS.

John C. Rankin, Charles R. Russell, and John H. Samalik, Sr.

U. S. Patent 3,073,724. January 15, 1963.

Acid-modified cereal flours that are selectively depolymerized so as to have superior paste and strength properties for the high-speed sizing of paper and textiles are prepared by drying raw flour or hydroxyethylated flour at 40°-100° C. to a moisture content of 0.7-1.4%, reacting the substantially dry flour or etherified flour at 25°-40° C. for 1-8 hours with 9-11 ml. of 2 N - 6 N HCl per 100 grams of flour so as to provide 0.8-2.5% of HCl based on the flour, and terminating the reaction with a neutralizing amount of alkali solution.

EXTRACTION OF A SUBSTANCE FROM DRY CITRUS MEAL WHICH INCREASES β -CAROTENE PRODUCTION BY BLAKESLEA TRISPORA.

Alex Ciegler, George E. N. Nelson, and Harlow H. Hall.

U. S. Patent 3,079,380. February 26, 1963.

High yields of beta-carotene from Blakeslea trispora are obtained in the absence of costly beta-ionone by substituting therefore about 2.5 to 5 parts per 100 parts of standard medium of commercial citrus molasses or about 5 to 10 parts of hot-water extract of solvent-extracted commercial citrus peel waste.

THE LACTONE OF 2-OXO-6-(2-HYDROXYPROPYL)-CYCLOHEXANECARBOXYLIC ACID.

Chester R. Benjamin, William F. Hendershot, and Clifford W. Hesseltine.

U. S. Patent 3,079,401. February 26, 1963.

A seed and fungal spore germination inhibitor composition comprising at least about 10 ppm. of the lactone of 2-oxo-6-(2-hydroxypropyl)-cyclohexanecarboxylic acid in an aqueous vehicle also comprising about 1% of a surface-active agent.

DISPERSANTS COMPRISING PHOSPHORIC ACID MONOESTERS OF MANNOSE POLYMERS.

Morey E. Slodki.

U. S. Patent 3,084,105. April 2, 1963.

Free-flowing pastes of zinc oxide for use in skin lotions and ointments are prepared by mixing zinc oxide with an equal amount of a 1% aqueous solution of the neutralized phosphoric acid monoester obtained by first subjecting a solution of the potassium salt of a phosphomannan polymer obtained by fermenting a species of Hansenula to cation exchange with the hydrogen form of a sulfonic acid exchange resin to form a solution containing the pyrophosphoric acid form of the phosphomannan polymer, removing the solids, heating the solution to about 100° C. for about 20 minutes to convert the pyrophosphoric acid group to the phosphoric acid monoester group, and neutralizing the solution.

METHOD OF PREPARING AN AIR-DRYING CONJUGATED SOYBEAN VINYL ETHER AND ISOBUTYL VINYL ETHER COPOLYMER.

Gus C. Mustakas.

U. S. Patent 3,085,079. April 9, 1963.

The air-drying copolymer of conjugated soybean fatty vinyl ether and isobutyl vinyl ether, said air-drying copolymer having been prepared by copolymerizing said vinyl ethers at room temperature to not above 30° C. for about 30 minutes, the copolymerization having been conducted in about 3 to 4 parts of water jacket-cooled toluene solvent (based on the total vinyl ether content) and in the presence of dropwise-added dilute stannic chloride solution.

CATIONIC POLYMERIC DIALDEHYDES AND THEIR USE IN MAKING WET STRENGTH PAPER.

Bernard T. Hofreiter, George Earle Hamerstrand, and Charles L. Mehlretter.

U. S. Patent 3,087,852. April 30, 1963.

Nitrogen-containing cationic starches are oxidized with periodate to form the corresponding dialdehyde derivative. The products are water-dispersible and substantive to hydrated cellulosic pulp at the beater. Paper products prepared therefrom show improved wet strength without curing.

Similar lists of publication abstracts and patents are available from the other three Regional Utilization Research and Development Divisions of the Agricultural Research Service, U. S. Department of Agriculture. The addresses and fields of research covered are:

<u>Division</u>	<u>Principal Fields of Research</u>
Eastern Utilization Research and Development Division 600 East Mermaid Lane Philadelphia, Pennsylvania 19118	Animal products: dairy, meat, fats, and leather; plant products: Eastern fruits and vegetables, tobacco, honey, maple, and new crops; and allergen studies.
Southern Utilization Research and Development Division Post Office Box 19687 New Orleans, Louisiana 70119	Cotton and cottonseed; tung fruit; pine gum; Southern fruits and vegetables, including citric, sweetpotatoes, and cucumbers; sugarcane; rice; peanuts; and new crops.
Western Utilization Research and Development Division 800 Buchanan Street Albany, California 94710	Western fruits, nuts, vegetables, and rice; poultry products; forage crops; wheat and barley; wool and mohair; sugar beets; dry beans and peas; castor beans; and new crops.

